The Ministry of Energy

ANNUAL REPORT 1985/86

Ontario Ministry of Energy

Honourable Vincent G. Kerrio
Minister

Ontario

To
The Honourable
Lincoln M. Alexander, P.C., Q.C., K. St.J., B.A., L.L.D.
Lieutenant-Governor of the Province of Ontario

May it please Your Honour:

For the information of Your Honour and the Legislative Assembly, it is my privilege to present the Annual Report of the Ontario Ministry of Energy for the fiscal year ending March 31, 1986.

Respectfully submitted,

Vincent G. Kerrio

Vincent G. Kerrio
Minister of Energy

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A Message from the Honourable Vincent G. Kerrio Ontario Minister of Energy

The cost and reliability of our future energy supplies will play a major role in Ontario's future economic development. And since most of the energy we consume comes from outside our borders, we must plan carefully and introduce policies and programs that will ensure a healthy energy future.

We can do a great deal to reduce wasteful consumption of energy in Ontario, and make the ways we use energy in our province more efficient. As well, the government is committed to policies that will provide as much affordable energy as possible from a variety of Ontario's own energy sources. If we can become more efficient energy users at the same time as we utilize more of the energy that lies within our own borders, I believe we will be in an excellent position to meet the future needs of our society.

This report contains many of the ministry's accomplishments during fiscal 1985-86. I am pleased by the increased emphasis within the ministry on energy conservation, efficiency and the development of our province's energy resources. These important directions will continue in the months and years ahead, as the ministry continues to work for a more energy-efficient Ontario.

Deputy Minister's Message
Duncan M. Allan

Fiscal 1985-86 was a year in which the energy scene changed dramatically. The ministry responded effectively to this challenge, thanks to the dedication and professionalism of the staff.

As well, our new organizational structure proved itself. We adapted to the rapid changes and strengthened our core business at the same time.

The ministry's goal of improving energy use and efficiency in Ontario was advanced by the new policies, programs and approaches implemented during the 1985-86 fiscal year. This report documents some of our achievements and outlines many of the major issues we faced. I am very pleased with what we were able to accomplish during the year and look forward to continuing progress in the future.

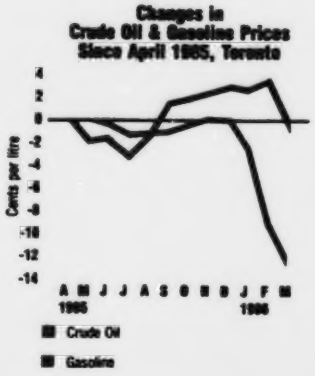
Energy Policy Issues: Managing the Dynamics of Change

Crude Oil and Gasoline

In March 1985, the governments of Canada, Alberta, Saskatchewan and British Columbia signed the Western Accord. The agreement deregulated Canada's crude oil pricing system, which had been administered by governments for more than a decade, and phased out or removed many of the federal taxes on oil and gas production.

The goal of the Accord was to permit the oil and gas industry to compete fully in the international marketplace. And, during 1985, returns from oil and gas production in Western Canada were greatly improved. Western Canada's oil and gas industry experienced its best year ever, in terms of wells drilled and new investment.

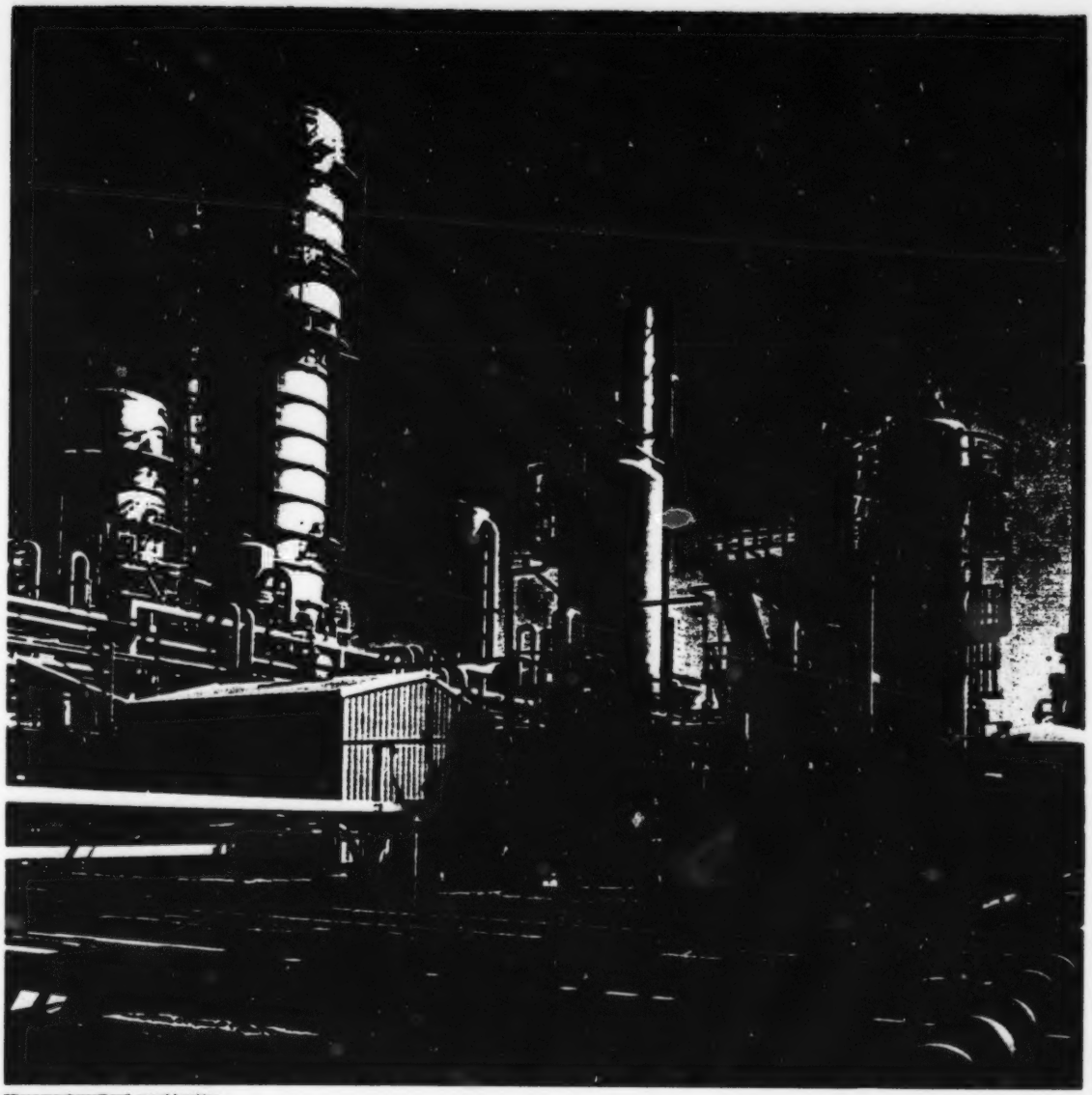
However, late in the year, crude oil prices began to fall on international markets – from just over $30 U.S. per barrel in late November 1985 to the $12 to $15 level, where they have remained ever since. These price drops were the sharpest price changes since the Iranian Revolution of 1979, and caused Western Canada's oil and gas industry to enter a severe slump.



As these significant developments in domestic and international crude oil markets emerged, the Ministry of Energy conducted detailed analyses of the likely effects of deregulation and lower oil prices on Ontario consumers, and on the provincial and Canadian economies. In general, the ministry concluded that lower prices would lead to widespread benefits for the national economy – through increased trade, lower costs for consumers and businesses, and reduced inflation and interest rates.

One concern that was given special attention during the fiscal year was gasoline pricing in Ontario. In early 1986, the ministry expressed concerns about the fact that, while crude oil prices were dropping fast, Ontario drivers were not receiving the benefits of these price decreases as rapidly. By March 1986, gasoline prices across the province had started to come down, but they didn't fall as quickly or as far as equivalent gasoline prices at retail outlets in the United States, even at stations just across the border from Niagara Falls, Sarnia, Windsor and Sault Ste. Marie. Throughout early 1986, the ministry consistently urged oil companies to pass on the full benefits of lower prices to Ontario consumers.

The ministry also completed a study in 1985-86 on the differences between gasoline prices in Northern and southern Ontario. The study revealed that, while significant price differences do exist from region to region across the province, the differences are mainly due to market forces.

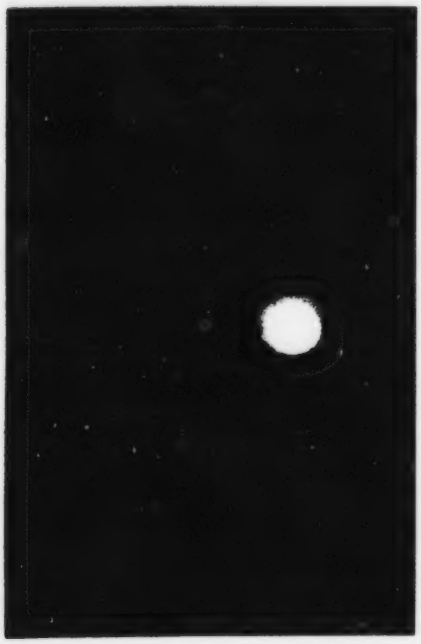


After several months of record-breaking activity during 1985, the world price of crude oil dropped by more than 50 per cent between November 1985 and early 1986.

Because of significant developments in the Canadian and international crude oil markets in 1985-86, the ministry conducted detailed analyses of the effects of deregulation and lower oil prices, and their potential impact on Ontario. In general, the ministry's studies concluded that lower oil prices would benefit the Ontario and national economies.

Northern Ontario represents a smaller market for gasoline than southern Ontario, and gasoline has to be transported long distances to the northern market. As well, the smaller population base in the North means that there are fewer independent gasoline retailers. These independents help make the southern market – with its frequent price wars and significant price fluctuations – much more competitive, with generally lower prices than in the North.

During the fiscal year, the ministry also voiced Ontario's concerns about increasing concentration in the oil and gas industry – both upstream, at the producing end of the business, and downstream, at the refining and marketing end. For example, Petro-Canada's purchase during the year of Gulf Canada's retailing outlets gave the company an even larger share of the Ontario market, which is now dominated by four large companies. The ministry argued that such takeovers can have a dampening effect on competition in the marketplace.



Only about one per cent of Ontario's natural gas supply comes from rigs like these in southwestern Ontario. The rest – $3.1 billion worth each year – comes from Western Canada.

Natural Gas

On October 31, 1985, the federal government and the energy-producing provinces signed the Agreement on Natural Gas Markets and Prices. The agreement froze wholesale natural gas prices for a period of one year, during which the industry would move to a market-sensitive pricing regime. With an annual natural gas bill of $3.1 billion, Ontario has a significant interest in these developments.

The ministry devoted considerable attention to advocating Ontario's position on market-oriented natural gas pricing throughout fiscal 1985-86. Our position is essentially that, with the current surplus of natural gas supplies in Canada, market-sensitive natural gas prices mean lower natural gas prices for consumers. The ministry advocated this position at public hearings and in presentations throughout the year to major gas users, distributors, TransCanada PipeLines Limited, other provincial governments, the federal government and the western oil and gas industry.

One of the developments arising from the agreement was that large-volume natural gas users in Eastern Canada can now arrange to buy gas directly from western producers, at substantial cost savings. Within a short time after the agreement was signed, several large Ontario industrial customers began purchasing discount-priced natural gas from the West.

As the year progressed, Ontario cautioned that progress toward natural gas deregulation was too slow, and that regulators, pipeline companies, distributors and

others involved should expedite the process, so that the November 1 deadline for negotiated prices could be met. Between January and April 1986, at National Energy Board hearings on the services available from TransCanada PipeLines Limited, the ministry participated actively – by cross-examining witnesses, providing expert testimony and presenting a final argument that summed up Ontario's position. The Board's resulting decision represented a significant step toward implementing a market-sensitive natural gas pricing system – basically by removing two of the major roadblocks standing in the way.

Electricity

Electricity is vitally important to Ontario, since it provides about 17 per cent of all the energy we consume. Electricity use in Ontario is expected to grow proportionally faster than other energy forms between now and the next century.

Over the past decade, Ontario Hydro has been expanding Ontario's electricity system to meet our needs into the 1990s, but planning to meet the electricity needs of the late 1990s and into the next century has now begun. The ministry launched major new policy development activities in electricity during 1985-86, with the goal of providing the government's policy direction and guidance to Ontario Hydro for future developments in Ontario's electricity system, between 1990 and 2005.

The ministry's analysis covers the potential for energy efficiency and strategic conservation, future clean coal-burning technologies, the potential for hydroelectric development, the value of cogeneration and the impact of electricity purchases from neighboring areas. This and earlier work gave rise to several new ministry publications on electricity during the fiscal year. These publications included *Parallel Generation in Ontario, New Directions for Meeting Tomorrow's Electricity Needs,* and *Streams of Power.*

In July 1985, the Select Committee on Energy was appointed by the provincial legislature to inquire into and report on several aspects of Ontario Hydro affairs. The committee chose to address the completion of the Darlington Nuclear Generating Station, Ontario Hydro's planning process and the relationship between the utility and the provincial government. The ministry devoted a great deal of effort to support the work of the committee during fiscal 1985-86. The ministry appeared before the committee to present its analysis and advice on the major issues, and monitored the committee's activities closely throughout the year.

Ontario has one of the best electricity production and distribution systems in the world – a system that now serves more than three million industrial, commercial and residential users.

ENERGY 2000:
Focusing on Our Energy Future

On November 18 and 19, 1985, the ministry hosted ENERGY 2000, a major international energy symposium and technology exposition in Toronto. The conference featured an impressive list of prominent energy specialists, with discussions focusing on the importance of energy issues, supply options, trends and policies in Ontario's future – all the complexities that make today's energy scene so challenging.

ENERGY 2000 also helped show people that there has been a great deal of progress over the past decade in new energy technology and equipment. The conference's technological showcase gave more than 50 energy companies an opportunity to display their products – an amazing array of the latest in energy-saving techniques and technology.

Ontario's Primary Energy Sources

*Quebec 6%, Saskatchewan 3%, B.C.1%

The exposition featured a natural gas-powered transit bus, undersea robots for working on offshore oil rigs, electric vehicles, revolutionary long-lasting lights, an international energy poster art competition, and many other displays.

To promote the broadest possible discussion during the conference, the ministry produced two detailed information papers. *The Shape of Ontario's Energy Demand* discussed the forces leading to change in energy use and their potential impact in the province; *Fuelling Ontario's Future* discussed Ontario's perspective on energy supply options for Ontario in the years to come. Both of these papers are available by contacting the ministry's communications services branch.

**Ontario's Energy Bill*
1970 – 1985**

*Based on Wholesale Prices

Ontario Energy Board Highlights

With the signing of the Western Accord and the Agreement on Natural Gas Markets and Prices, fiscal 1985-86 was a year of major changes and challenges for the energy sector. Regulatory authorities had to respond quickly and flexibly to these changes, and the new environment was especially challenging for the Ontario Energy Board.

The Board regulates natural gas distributors in Ontario. It also conducts public hearings on proposed Ontario Hydro rate increases, and reports to the Minister of Energy on its findings. From time to time, the Board's advisory responsibilities also lead to public hearings on a wide range of emerging energy issues.

During 1985-86, the Board responded promptly to accommodate the opportunities presented in the Agreement on Natural Gas Markets and Prices. In response to the direct sales provisions of the natural gas agreement, for example, the Board quickly issued initial interim rates – to allow direct sales to Ontario's large gas users to begin. Ultimately, the Board's contract carriage hearings resulted in the setting of interim rates, as well as an accelerated approval process, which will provide valuable experience with the new system. For a complete report on the Board's activities, refer to the Ontario Energy Board 1985-86 Annual Report.

Ontario Premier David Peterson welcomes delegates to ENERGY 2000, an international symposium focusing on the future of energy. This ministry-sponsored conference was held in Toronto in November.

To enhance Ontario's ability to meet future energy needs, one of the government's major priorities is strengthening its commitment to energy efficiency and conservation. Improving efficiency implies increasing Ontario's output of goods and services without a proportional increase in energy used. Conservation involves reducing wasteful or unnecessary energy use.

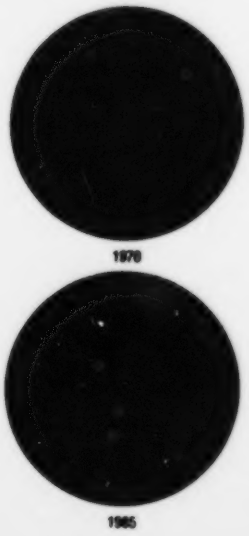
Energy Conservation and Efficiency: Changing the Shape of Ontario's Energy Demand

Since the price shocks of the 1970s, major improvements have been made in the ways Ontario uses energy. Wasteful and unnecessary uses have been cut back, and improved techniques and materials have been developed, tested and brought to market. But there is still tremendous potential for saving energy in Ontario. And the Ministry of Energy has an important leadership role to play – to maintain the conservation ethic, and to ensure that information about wise energy use is available in the marketplace.

The ministry is committed to making Ontario a more energy-efficient province. Energy conservation and efficiency are important goals in themselves – and will also make a strong contribution to our province's long-term economic strengths. The ministry also sponsors and encourages the research, development, testing and marketing of new energy technology. Developing new technologies helps strengthen the productivity and competitiveness of our industries, and also helps create new business and export opportunities for our entrepreneurs.

The program highlights that follow describe some of the ministry's accomplishments during fiscal 1985-86.

Ontario's Energy Demand by Sector 1970 and 1985



Note: The Industrial Sector includes Petrochemicals and other non-energy uses.

Providing Energy Leadership in Ontario

In 1975, the Government of Ontario introduced an off-oil and energy conservation program for its own buildings. The 9,000 buildings included office complexes, law courts, laboratories, police stations and garages. This highly successful program was extended in 1981, and similar programs were introduced for non-profit institutional facilities such as hospitals, schools, colleges, universities, homes for children and the aged, and museums.

By the end of 1985, a total of $37 million had been invested in the program, with some impressive results. For example, energy use had been reduced by 29 per cent in three-quarters of the government-owned building space across the province. As well, Ontario's schools and universities had reduced oil use by 152 million litres per year, and colleges had cut their energy use by 31 per cent. Overall, energy costs in Ontario government and institutional buildings across Ontario had been reduced by more than $16 million annually.

The special features and construction methods that went into this R-2000 home in Smiths Falls, Ontario, can save the owners up to 75 per cent in energy costs over a conventional home.

In the years to come, the government will encourage the building of new housing units with higher levels of energy-efficiency. The building industry and homebuyers will be encouraged to accept – and expect –higher energy performance standards, such as the R-2000 standard for new homes, and the use of high-efficiency heating systems.

Promoting Sound Energy Education

One of the best places to start encouraging the wise use of energy is with our schoolchildren. The ministry has developed an innovative approach to helping Ontario educators teach young children about why conservation of non-renewable resources is important in their daily lives. The ministry's educational program has grown rapidly over the past three years, focusing on *The Conserving Kingdom*, a 45-minute play with puppets and live actors – and starring Dudley the Dragon, the ministry's lovable mascot.

Dudley and his fellow performers have played to enthusiastic audiences for three years now, and more than 100,000 children across the province have now seen the play performed. In 1985-86, the play toured schools in Northern Ontario, using the newly-developed French version for francophone communities. A 15-minute puppet show version of the play was also produced during the year. And, to ensure the message of the play reaches as wide an audience as possible, the ministry produced film and videocassette versions of the play in both French and English. These are being made available to schools across the province, and are also slated to be shown on television in the near future.

These children are obviously delighted at the antics of Dudley and his friends during a Toronto performance of the ministry's play, *The Conserving Kingdom*.

To complement the educational themes in the play, the ministry also produced a new children's activity book based on the story of the play, and an education kit for all teachers whose students attend the play. The kit was designed to help educators teach energy efficiency, and is available in both French and English.

Ministry staff work closely with the Ontario Ministry of Education, school boards and teacher organizations across Ontario to complement the energy curriculum for primary and secondary grades across the province. Through Energy Educators of Ontario – a non-profit organization of hundreds of primary and secondary teachers and other educators – the ministry helps students at all levels gain a greater awareness and understanding of the vital role of energy in their daily lives.

"Homing in" on the Future

There are some 3.2 million homes in Ontario, and they consume almost 20 per cent of all the energy used in the province. Since 1980, residential energy use in Ontario has been cut by about nine per cent, but the potential for further reductions – both in new and existing homes – is still significant.

Dudley the Dragon, the lovable, sneaker-clad star of *The Conserving Kingdom*, and Duncan M. Allan, Deputy Minister of Energy, officially opened the ministry's display at the 1986 Toronto Home Show.

If we want tomorrow's consumers to use energy wisely, we must begin by educating today's children about its importance. *The Conserving Kingdom* tells children why conservation of non-renewable resources is important in their daily lives, and does it in an entertaining, exciting, innovative and educational way.

Three-quarters of Ontario's homes were constructed before the first energy price shocks of the 1970s, and many of these homes have not yet been upgraded to economic levels of energy efficiency. The potential ranges from simple measures to reduce air leakage, such as caulking windows and weatherstripping doors, to major structural improvements, such as new thermal windows, basement wall insulation, and higher-efficiency furnaces.

As well, new energy-efficient houses can reduce heating costs significantly, compared to standard new homes. With 60,000 or more new homes built in Ontario each year, the new housing market represents an area with major potential for permanent improvements in the province's energy efficiency.

Promoting R-2000 Homes

The energy supply interruptions of the 1970s gave a new sense of urgency to government research and development into energy-efficient housing in Canada – but not without results. An impressive new home concept emerged – the R-2000 home – a home with high levels of insulation, near-airtight construction, state-of-the-art heating and ventilation systems, and designs with energy-efficiency in mind.

Doug Geddes, one of a six-member panel of architects and energy technology specialists, is seen here evaluating one of the entries in the first R-2000 Student Design Challenge.

The technology and special construction techniques that go into an R-2000 home make it possible to save up to 70 per cent in energy costs over conventional homes. Over the past several years, the ministry has been working with the federal government and the construction industry to promote the building of more R-2000 homes in Ontario.

To promote the benefits of R-2000 to home-buyers, the ministry conducted two provincewide open houses in September 1985 and March 1986. Approximately 22,000 people visited 70 R-2000 houses in 30 communities across the province. Participating builders were glad of the promotional opportunity provided by the open house, which resulted in 100 homes being sold.

Ontario Students Take the R-2000 Challenge

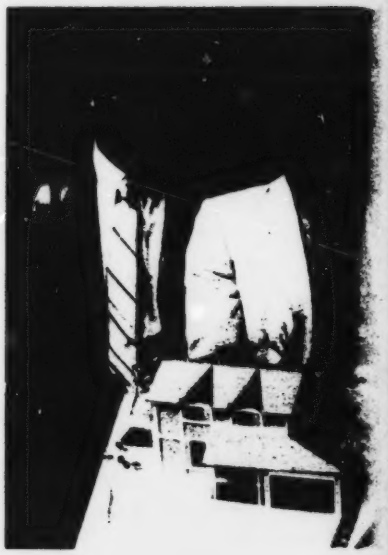
To help develop greater awareness of R-2000 homes in young architectural students in Ontario, the ministry launched the first annual R-2000 Student Design Challenge in 1985-86.

Some 455 students from 14 colleges and universities across the province submitted designs for the ultimate R-2000 home. The winning school received a $10,000 award out of $25,000 in total bursaries from co-sponsor Fiberglas Canada. A second sponsor, Select Home Designs, provided the top students with a four-month architectural apprenticeship, at the Company's Vancouver office.

Low-energy Housing for the North

Northern Ontario's severe winters mean higher energy costs than in the South. During 1985-86, a ministry project in Armstrong, Ontario, showed that low-cost retrofit techniques and economical energy-efficient new home designs can help establish new standards of comfort for homes in remote northern areas.

The ministry provided $126,000 ($25,000 in fiscal year 1985/86) to implement and evaluate changes that could be made to upgrade existing houses in Armstrong – a community of 126 households located north of Thunder Bay. The ministry also commissioned a design for several new low-energy homes suitable for construction in remote areas of the province. The new home design – and two others adapted from it – were used by the Ministry of Education and the Northern District School Area to build 13 new houses for area teachers. The actual space-heating costs during the first heating season were about one-eighth of those for standard code-built homes.



University of Waterloo students Montgomery King (l) and Filippo Scarpazza were the top prize winners in the R-2000 Student Design Challenge.

HeatSave

Since 1980, the ministry's HeatSave program has advised some 175,000 local homeowners across Ontario on how to lower their energy bills. During fiscal 1985-86, 23,000 Ontario homeowners again took advantage of HeatSave's free advice. HeatSave clinics were held in the communities of Orangeville, Bracebridge/ Gravenhurst, Collingwood, Brampton, and London for the first time, and more than 20,000 homeowners visited.

For the second year in a row, the ministry offered HeatSave North service to residents of Northern Ontario communities with a population of less than 9,000. The clinics went to Dryden, Sioux Lookout, Ignace and Smooth Rock Falls. French clinics were offered in Iroquois Falls and Cochrane. The total two-year attendance of the northern clinics was more than 7,500.

Conserving Energy in Commercial Buildings

Commercial buildings – such as offices, stores, warehouses and hotels – use about 15 per cent of Ontario's energy. Many of today's new commercial buildings consume only about one-quarter of the energy used by buildings constructed just 10 years ago. But there is considerable potential for savings in existing buildings – as much as 30 per cent per year.

The ministry's Downtown Energy Forum is aimed at promoting volunteer corporate participation in energy management. Through ministry-sponsored seminars, technical advice, promotional material and information-sharing, building managers, owners, and operators learn how to reduce operating costs by saving on energy.

During the fiscal year, 146 buildings in Toronto and Ottawa achieved total savings of $10.2 million through improved energy management. In just eight years, the cumulative private sector savings of the program participants are now estimated at $36 million.

The enthusiastic participation and impressive figures of the Downtown Energy Forum led the ministry to introduce a new energy management program designed to improve energy use in medium-sized Ontario cities during 1985-86. Like the Downtown Forum, the Cities Energy Forum is voluntary, and brings together senior officials of private commercial businesses. The Forum tells them how to achieve savings of up to 30 per cent every year on their energy bills, mainly through low-cost and no-cost measures.

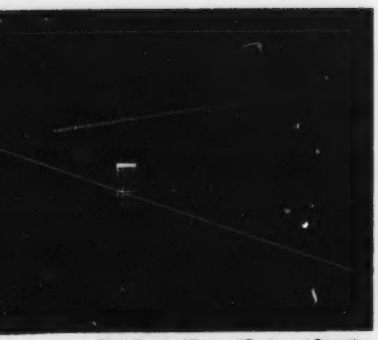


Photo Courtesy Ministry of Tourism and Recreation

The ministry's Downtown Forum is helping owners, operators and managers of commercial buildings in Toronto and Ottawa save millions of dollars on energy costs every year.

In 1985-86, a pilot program was offered in Sudbury, Oshawa, Niagara Falls, and London, and the program will expand to 20 cities and communities during the next five years. With participation of the Association of Municipalities of Ontario, local chambers of commerce and technical societies, the ministry offers logistical support, information-sharing, and seed money. This support is aimed at stimulating a self-sufficient energy efficiency program in each community within three years.

Promoting Energy Efficiency in Industry

Ontario's industries spent about $3 billion on fuel and electricity in 1985 – a figure that represents 47 per cent of the total industrial electricity and fuel bill for all of Canada. Ontario's industrial base is highly energy-intensive, and studies indicate that our industries could improve the efficiency of their energy use by at least 20 per cent.

During 1985-86, the ministry's energy technology development program actively supported demonstrations of several energy-efficient technologies for

industrial applications – technologies that can reduce energy use and waste, and help make Ontario industries more competitive around the world.

In one example from fiscal 1985-86, Southam Murray Printing of Toronto installed a new, $170,000 energy monitoring system, with about $50,000 in financial assistance coming equally from the ministry and the federal government. The system uses micro-computers to collect and analyse energy consumption information used to prepare reports and point out areas in the plant where energy efficiency improvements can be made. Thought to be the first of its kind in Canada, Southam Murray's new system is saving the company almost $100,000 a year in energy costs alone.

Energy-efficient Transportation: the Drive Is On

Car ownership in Ontario is among the highest in the world – at 45 cars for every 100 people – and that number will keep growing as the province's population increases. And as the economy grows, more freight will have to be moved, mainly by trucks, trains and ships. Since 1980, the ministry has been involved with the Ministry of Transportation and Communications in transportation programs designed to help reduce Ontario's dependence on oil.

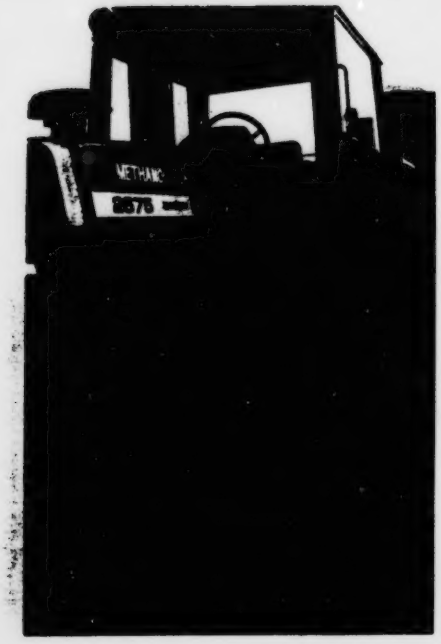
The ministry's DriveSave seminars help train licensed drivers, new drivers, and drivers of commercial/institutional fleets to be more energy-conscious on the road. During 1985-86, 11 seminars for fleet managers were held across Ontario. The managers who attended received information on transportation fuel economy, and went back to work to share the information with their 23,000 drivers. DriveSave seminars are also available for driving instructors, to help them educate new drivers about energy efficiency. Seminars were held in 12 Ontario communities, and were attended by driving instructors who teach more than 39,000 students.

To promote fuel savings in the trucking industry, the ministry's TruckSave Fuel Economy Challenge continued to spread the word to those who own and operator tractor-trailer fleets. Fiscal 1985-86 was TruckSave's fourth year, and Ontario's over-the-road fuel economy competition for professional drivers has become a very popular annual event.

More than 275 truckers in 36 type classifications drove over three Ontario city-to-city routes. The drivers were challenged to use less fuel by practising techniques such as reducing speed, and accelerating and braking more gently. The Challenge is sponsored by the Ministry of Energy, the Ministry of Transportation and Communications and the Ontario trucking industry.

To help reduce fuel consumption in Ontario's trucking industry, the ministry's TruckSave program encourages fleet owners and professional drivers to practise fuel-efficient driving techniques.

Developing the Energy Technologies of Tomorrow



The ministry supports the development and use of alternative fuels. Methanol-fuelled tractors, like this one, help Ontario farmers cut their fuel costs and reduce diesel emissions in the environment.

Alternative Fuels: Ontario's Moving Way Ahead

Transportation accounts for about 24 per cent of Ontario's total energy use, and almost 60 per cent of all the oil we use. By encouraging greater use of alternative fuels, the ministry remains committed to reducing the overall use of oil-based fuels in Ontario thus decreasing the environmental problems they create.

In 1985-86, the ministry participated in more than 40 research, development and demonstration projects, with the objective of using alternative fuels technology to extend and replace conventional transportation fuels.

Flexi-fuel Vehicles Hit the Road

A new $1.4 million vehicle research program was launched by Ford of Canada and Shell Canada, with financial assistance from the ministry and the federal government. The program focused on developing and testing cars that can run on gasoline or methanol, or a mixture of the two in the same fuel tank. Twenty Crown Victoria passenger cars produced at St. Thomas, Ontario have been modified to Flexi-Fuel operation.

Putting Some Spark into the Big Diesels

Approximately 30 per cent of fuel used in transportation in Ontario is consumed by trucks – primarily diesel-fuelled vehicles. Aside from their heavy consumption of oil-based fuel, there is concern over the future quality of diesel fuel, and about the environmental impact of its emissions. To address these concerns, the ministry helped fund a number of research projects into combining gaseous fuels with diesel fuel to extend diesel output, mixing methanol with diesel fuel to reduce emissions, and substituting alternatives for diesel fuel, by converting diesel engines to spark ignition systems.

Developing Ontario Energy Technologies

Because Ontario now gets most of its energy from outside the province, the ministry supports the development of our own renewable energy resources, and new alternative energy sources that can substitute for oil. Following are some of the projects undertaken in the renewable and alternative energy areas during fiscal 1985-86.

Ontario has more than five million vehicles and one of the largest per capita car ownerships in the world. The ministry supports alternative fuel technologies that can reduce Ontario's dependence on oil-based transportation fuels.

To continue to improve energy efficiency in Ontario, we must increase the amount of research into energy-efficient technologies, and to help develop them so that they reach the homeowners, building operators, fleet managers, car owners, farmers and entrepreneurs who need them. As well, we need to develop new technologies that will enable us to discover and use more abundant sources of energy than the exhaustible ones we now depend on.

Small Hydro Now Big Business

Rising energy prices in the 1970s created a lot of new interest in an old idea: small hydro power. Since 1980, the ministry has promoted the development of small hydro sites by providing assistance and advice to people interested in what small hydro has to offer.

With more than 30,000 rivers and streams in Ontario, there is great potential for further small hydro development. Promising small hydro opportunities exist at remote northern communities, tourist lodges, mine and forestry operations, as well as at abandoned sites owned by municipal utilities, and grid-connected sites.

Several events during the 1985-86 fiscal year helped encourage small hydro development. These included a review of Ontario's buy-back rate (the rate Ontario Hydro pays when buying power from the private sector), changes to the tendering process for small hydro projects, clarification of government-wide policy on small hydro, and changes to Ontario Hydro's traditional first right of refusal to develop small hydro sites.

The Elora Mill, an historic landmark on Ontario's Grand River, is a fine example of an old idea made new again. The small hydro installation, seen on the lower section of the building, taps the river's flow to produce enough electricity to power the inn.

Boosting an "Old-fashioned" Technology

In March 1986, the ministry sponsored Small Hydro '86, a conference that examined the progress made by Ontario's small hydro industry during the last five years. The conference also focussed on strategies for the next few years – now that Ontario's industry is poised for growth. The participants explored opportunities for exports and further domestic small hydro development, and offered an in-depth engineering course, seminars, and a trade show.

Small Hydro '86 was one of the largest conferences ever organized by the ministry. More than 500 people participated, resulting in maximum enrolment in the engineer's training workshop, numerous contracts and sales by Ontario suppliers at the trade show, and an outstanding calibre of speakers and other small hydro specialists.

Demonstrating Ontario's Energy Technologies at Science North

The ministry provided $135,000 for several renewable energy demonstration projects at Sudbury's Science North museum during 1985-86. The exhibits give Northern Ontario residents a chance to see the tremendous potential of renewable energy systems. Four systems are included in the demonstrations: a solar hot water system designed to provide hot water for Science North's Snowflake Restaurant; a wind energy system that will provide up to 10 kilowatts of power at the complex; a photovoltaic (solar electric) system to power part of the new solar observatory; and a portable solar energy display, to be used by the Centre's staff on school visits.

Cogeneration Comes to Chapleau

The first wood-fired generation plant in Ontario to enter into a parallel generation agreement with Ontario Hydro is expected to begin operating in the fall of 1986, in Chapleau. The ministry has provided $1 million toward the $14 million cogeneration plant. (Cogeneration involves the production of thermal and electrical energy in one overall process.)

The Chapleau plant is owned and operated by Chapleau Cogeneration Ltd., a subsidiary of Foster-Wheeler Canada, and is one of the largest wood-fired cogeneration plants ever to be built in Ontario. It will be capable of burning 108,000 tonnes of wood residue per year, providing a convenient way for local mills to dispose of their wood. The plant will create about 13 full-time jobs in the Chapleau area, and approximately 70 jobs were created during the construction phase of the plant. When completed, the facility will be capable of displacing the equivalent of more than 23 million litres of oil annually, through the production of 50 million kilowatt-hours of electricity.

The Chapleau cogeneration plant is presently under construction. When completed, the facility will burn wood residue to produce thermal and electrical power.

Kortright's New Windmill

The energy demonstration projects at the Kortright Conservation Centre – which include solar, wind and small hydro systems, as well as other alternative energy systems – draw about 90,000 visitors to the centre each year. During the past fiscal year, the ministry assisted with the installation of a new 19-metre wind turbine, which is expected to raise the centre's profile still further.

Windmills have been used around the world for centuries. But since the energy price shocks of the 1970s, windmill design has been advanced in a number of countries, including the United States, Germany, the United Kingdom and Canada.

Ontario-based ADECON Energy Systems developed the wind turbine that is now installed at Kortright. Ministry assistance to the project began after ADECON completed its initial tests on the wind generator at the Atlantic Wind Test Site in Prince Edward Island. After submitting a proposal to the ministry in 1985 for the development of three subsystems, the company went on to improve the windmill's reliability, lifespan, and price.

The Kortright Centre's new wind generator has limited applications in Ontario, but its export potential to the United States market may prove to be significant. In fact, a sale to California valued at more than $7 million for 50 windmills is currently being negotiated. The ministry committed $70,000 toward the $260,000 project, and has also provided valuable assistance in identifying markets for the windmill both in Canada and abroad.

This vertical-axis wind turbine at the Kortright Conservation Centre, north of Toronto, is a fine example of the ministry's continued support of the development of alternative and renewable energy technologies.

Improving the Quality of Ontario Grain

The ministry's Grain Dryer Retrofit Assistance Program helps commercial grain dryer operators in Ontario outfit their dryers with fully automatic control systems. Monitoring shows that a 10- to 20-per cent reduction in fuel can be achieved by grain dryers retrofitted with automatic control systems. In Ontario, this has amounted to annual savings of more than two million cubic metres of fuel. The technology improves the quality of the dried grain and also helps increase export potential, through reduced grain spoilage.

Commercial grain drying operators licensed under the Grain Financial Protection Program can receive assistance of up to one-third of the installed system costs, up to a maximum of $30,000. The program runs from November 1984 to March 1987, and the ministry expects to approve applications amounting to $1,000,000 in grants – which is expected to stimulate investments of more than $3.5 million in microprocessor control systems.

With ministry assistance, London's Victoria Hospital is building a new facility that will burn municipal waste to produce heat and light.

Making Energy from Municipal Waste at London's Victoria Hospital

London's Victoria Hospital is breaking new ground with its energy from waste facility. The hospital is constructing a new plant designed to cogenerate electricity, steam and hot water, using the city's garbage and sewage as fuel. The project will reduce the city's landfill needs by using up to one-third of London's solid waste over a 20-year period. It will also increase the hospital's self-sufficiency. The equivalent of 19 million litres of oil will be saved each year by the new installation – enough to heat 6,250 average-size homes in London.

EnerSearch Gets Rolling

During 1985-86, the ministry introduced a new incentives program to assist the development of energy technologies and innovative energy conservation techniques. The $3 million program – called EnerSearch – offers incentives to Ontario companies for research, development and the demonstration of new energy technologies. The program will also assist companies interested in developing equipment and capabilities to utilize new forms of energy.

EnerSearch covers a wide range of activities, including alternative transportation equipment, fuel research and evaluation, electrotechnologies, energy efficient industrial processes, heat recovery, renewable energy, and many more. Participants in the program will receive an average total government contribution of 33 per cent of the total projected eligible costs. Direct project costs, performance monitoring costs and technology transfer costs can all qualify for assistance under EnerSearch.

These grain silos in Blenheim, Ontario, use electronic controls to reduce energy consumption in grain drying, and to improve the drying process to produce better-quality grain for export.

Ontario industries need to give energy operating costs and efficiency a higher priority when investing in new facilities and equipment. Many energy-efficient technologies have been developed in recent years: the challenge is to begin adopting them more widely. In existing industrial facilities, conducting energy audits and making cost-effective improvements in buildings, utility plants and process equipment will help Ontario's economy keep pace with the improvements being made by our international competition.

Exploring Plasma's Potential

The development of plasma technology for industrial processing of minerals, ceramics, metals and chemicals is still largely experimental. But plasma arc is already being explored in many countries in iron and steel making, non-ferrous minerals smelting and production of metals and advanced ceramics.

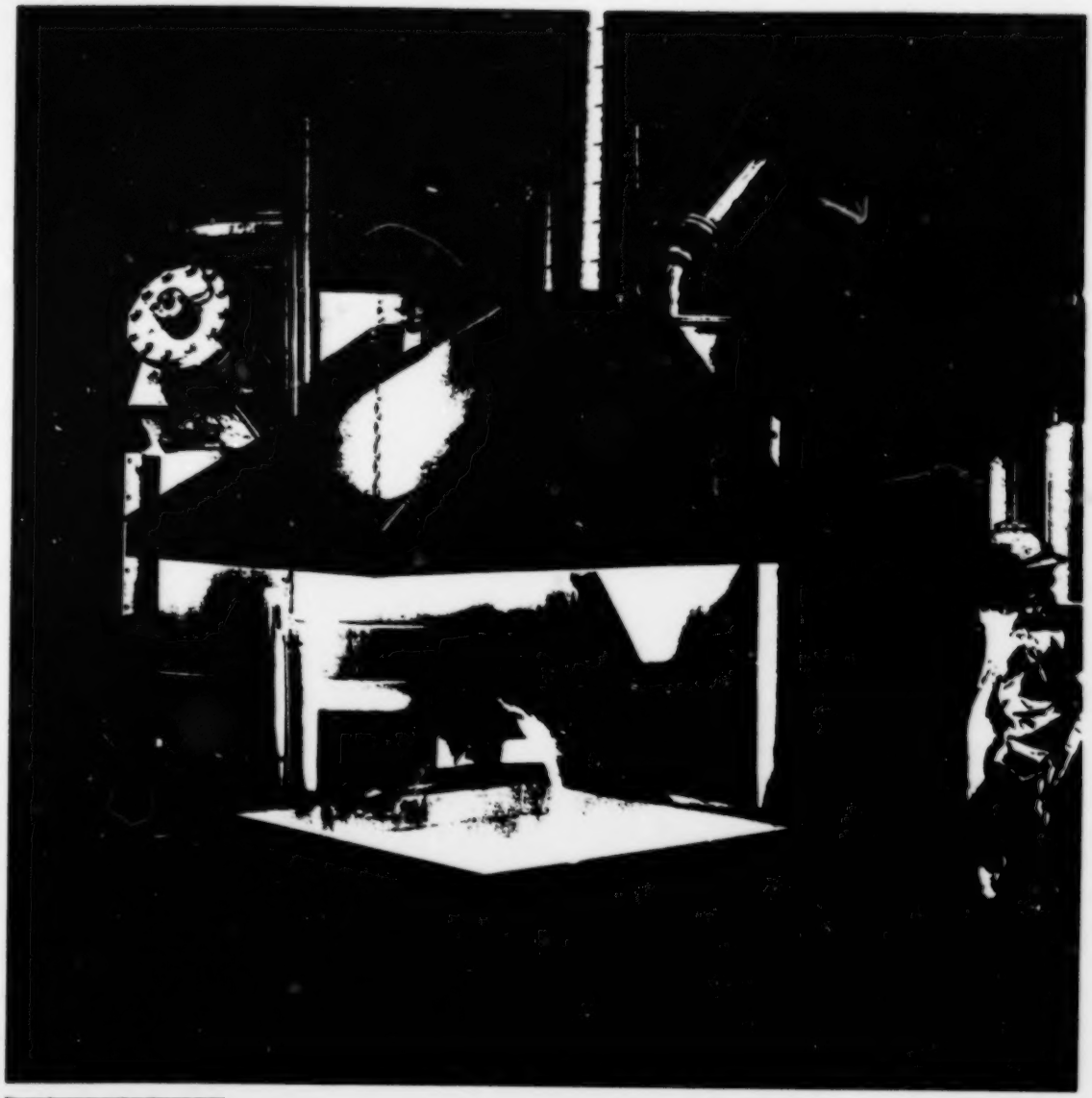
A prime example of plasma arc technology applications is the $1.3 million Howden plasma arc research project, which is designed to recover metals from steel mill waste. The co-operative project is managed by Howden Group Canada Ltd., an equipment manufacturer, and the Ontario Research Foundation. The technology used in the furnace was originally developed at the University of Toronto.

Another co-operative project is expected to help the province's mining industry to use energy more efficiently and to reduce sulphur dioxide emissions. The INCO plasma furnace is a co-operative project involving INCO Ltd. and the Governments of Canada and Ontario.

The ministry is also assisting the development and operation of a small pilot plant to determine if plasma can be used to convert municipal waste to a useful form of gas. Also participating in the project are Resorption Canada Ltd., OBOE Engineering Ltd., Plasma Energy Corporation, Ontario Hydro, and the Ontario Ministry of the Environment.

From Wood to Motor Fuel

In 1985, the ministry provided a $237,000 grant to St. Lawrence Starch Company to test and develop new, cost-effective ways to produce fuel ethanol from wood and wood residues, as well as other indigenous Ontario materials. The goal of the project is to demonstrate that ethanol can be produced from these materials at an attractive price, without the need for major government incentives. If the price is right, ethanol has potential for use as an octane-enhancer in gasoline. The ministry's grant covered half of the total cost of the 18-month project.



Plasma furnaces, such as this one at the Ontario Research Foundation, have wide application in metallurgy, steel making and waste metals recovery.

Energy-efficient plasma arc furnaces are capable of generating great heat at significantly lower fuel costs than conventional furnaces. The ministry supports the development of this and other innovative technologies to keep Ontario on the leading edge of energy-efficient equipment, techniques, and processes.

1985/86 Spending

MINISTRY OF ENERGY

Description	Total $
1985/86 Estimates	116,275,807
Plus Management Board Approvals	307,267,600
Adjusted Total	423,543,407
Less 1985/86 Expenditures	(402,470,391)
Plus 1985/86 Recoveries	9,608,059
Total Underspending	30,681,075
Management Board Constraints	(28,099,400)
Management Board Offsets	(2,267,600)
Adjusted Underspending	314,075

1985/86 Spending Distribution

Ministry Division	1985/86 Estimates	Board Approvals	Adjusted Total	*1985/86 Expenditures	Total Under-spending	Board Constraints	Board Offsets	Adjusted Under-spending
Main Office	1,366,307	0	1,366,307	(1,308,158)	58,149	(55,400)	0	2,749
Communications & Mgmt. Services	7,996,500	0	7,996,500	(5,894,555)	2,101,945	(2,042,500)	0	59,445
Policy & Planning	4,996,900	0	4,996,900	(4,267,723)	729,177	(232,800)	(414,400)	81,977
Programs & Technology	30,093,300	1,200,000	31,293,300	(29,532,084)	1,761,216	0	(1,603,200)	158,016
Ontario Energy Board	2,572,800	1,067,600	3,640,400	(3,640,334)	66	0	0	66
Ontario Energy Corporation	69,250,000	305,000,000**	374,250,000	(348,219,478)	26,030,522	(25,768,700)	(250,000)	11,822
Totals	116,275,807	307,267,600	423,543,407	(392,862,332)	30,681,075	(28,099,400)	(2,267,600)	314,075

*Net of recoveries

**Discharge of Sun Note

Ministry of Energy Project Expenditures – 1985/86

(Tabulated by Technology and Funding Activity)

Technology	Research & Development	Development & Demonstration	Advisory Services	Education	Direct Support	Program Development	Total $	Total Projects
Agriculture Retrofit	0	274,439	0	0	514,353	0	788,792	141
Building Retrofit	0	25,467	0	21,300	4,947,888	0	4,994,655	10
Combustion Waste	0	3,089,940	0	0	400,000	0	3,489,940	10
Computer Controls	0	37,370	0	0	336,457	0	373,827	20
Electro-Technology	232,796	264,483	0	0	0	0	497,279	22
Energy Audit	0	0	0	0	567,595	2,021	569,616	12
Fusion	266,960	0	0	0	0	0	266,960	2
Hydrogen	2,206,854	0	0	0	0	0	2,206,854	16
Methanol	292,623	175,141	0	0	0	0	467,764	8
Municipal Retrofit	0	0	0	0	995,892	0	995,892	196
Natural Gas	111,676	61,057	0	0	0	0	172,733	5
NGV	47,331	637,430	0	0	80,000	0	764,761	17
Oil Conversion	0	0	0	0	609,229	0	609,229	73
Propane	0	436,581	0	0	0	0	436,581	9
R-2000	0	292,139	0	0	0	0	292,139	4
Residential Retrofit	0	4,111	491,250	0	814,384	27,794	1,337,539	19
Small Hydro	0	121,859	0	0	0	0	121,859	7
Solar	0	396,174	0	0	2,503	0	398,677	19
Waste Heat Recovery	0	77,883	0	0	2,290,000	0	2,367,883	7
Wood Burning	31,546	452,944	0	0	0	0	484,490	9
Other	56,293	224,189	0	0	0	321,395	601,877	24
Subtotal	3,246,079	6,571,207	491,250	21,300	11,558,301	351,210	22,239,347	630
Energy Study	19,437	500,786	0	0	330,625	0	850,848	59
Marketing	0	27,969	48,678	4,411,116	0	0	4,487,763	135
Total $	3,265,516	7,099,962	539,928	4,432,416	11,888,926	351,210	27,577,958	824

Ministry of Energy Project Expenditures – 1985/86

(Tabulated by Client Group and Funding Activity)

Client Group	Research & Development	Development & Demonstration	Advisory Services	Education	Direct Support	Program Development	Total $	Total Projects
Agri-Industry	0	91,435	0	0	960,810	0	1,052,245	151
Builders	0	248,148	0	0	0	0	248,148	2
Churches/Temples	0	0	1,530	0	0	0	1,530	1
Commercial Real Estate	0	40,000	40,000	24,932	0	0	104,932	3
Conservation Authorities	0	8,955	0	90,000	0	0	98,955	2
Consumers	0	25,491	498,398	838,503	0	0	1,362,392	25
Farms	0	82,914	0	9,433	0	0	92,347	5
Hospitals	0	2,850,000	0	0	40,000	0	2,890,000	2
Industry	261,586	634,213	0	137,311	0	0	1,033,110	34
Municipalities	0	455,033	0	481,632	1,888,142	0	2,824,807	301
Ontario Government	505,903	1,162,329	0	833,375	6,298,494	256,204	9,056,305	124
Organizations	0	147,764	0	275,892	97,094	0	520,749	20
Research Institutions	2,156,854	95,557	0	88,242	0	0	2,340,653	19
Retailers	0	2,000	0	0	0	0	2,000	1
Schools	0	35,290	0	1,076,045	0	0	1,111,334	9
Service Firms	1,960	457,904	0	197,018	54,051	95,006	805,939	34
Tourist Operators	0	43,906	0	0	0	0	43,906	3
Transportation	227,538	483,475	0	328,830	0	0	1,039,842	39
Universities/ Colleges	100,000	138,174	0	48,434	550,336	0	836,944	41
Utilities	11,676	97,376	0	0	2,000,000	0	2,109,052	7
Other	0	0	0	2,770	0	0	2,770	1
Total $	3,265,517	7,099,962	539,927	4,432,416	11,888,926	351,210	27,577,958	824

Research & Development Expenditures

(Thousands of $)

Type	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1985/86 Projects
Solar	2,347.0	4,151.0	5,734.0	3,217.0	2,587.1	398.7	19
Combustion Waste	2,554.0	2,810.0	4,724.0	4,393.0	704.4	3,489.9	10
Hydrogen	0.0	0.0	972.0	1,554.5	2,951.0	2,206.9	16
Fusion	61.4	138.7	134.0	185.0	429.6	267.0	2
Alternatives	0.0	4,017.0	5,497.0	4,526.5	4,931.8	4,914.3	88
Total	4,962.4	11,116.7	17,061.0	13,876.0	11,603.9	11,276.8	135

Energy Conservation Expenditures

(Thousands of $)

Category	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1985/86 Projects
Ontario Government Buildings	3,408.5	3,451.9	5,305.8	3,008.1	2,091.3	4,947.9	8
Financial Assistance	1,503.8	3,868.2	7,708.4	4,411.8	4,911.5	6,035.6	433
Technology Transfer	1,704.3	2,537.1	3,003.3	3,208.6	2,368.0	1,224.8	77
Technology Development	2,706.8	6,089.1	5,706.2	5,013.4	1,924.0	723.6	26
Education/Awareness	5,313.3	3,944.5	3,303.6	2,506.7	3,507.3	1,837.1	76
Total	14,636.7	19,890.8	25,027.3	18,148.6	14,802.1	14,769.0	620

Energy Consumption in Ontario

	Petajoules*		% Change from 1981	
End Uses	1985	1986**	1985	1986**
Industry (except petrochemicals)	815	833	-1.6	0.6
Petrochemicals and other uses	203	204	9.1	9.7
Transportation	568	574	-3.9	-2.9
Residential	443	450	-0.7	0.9
Commercial	352	362	8.3	11.4
Total End Use	2,381	2,423	0.2	2.0

*One Petajoule is equivalent to about 160 thousand barrels of oil
**Estimated Figures

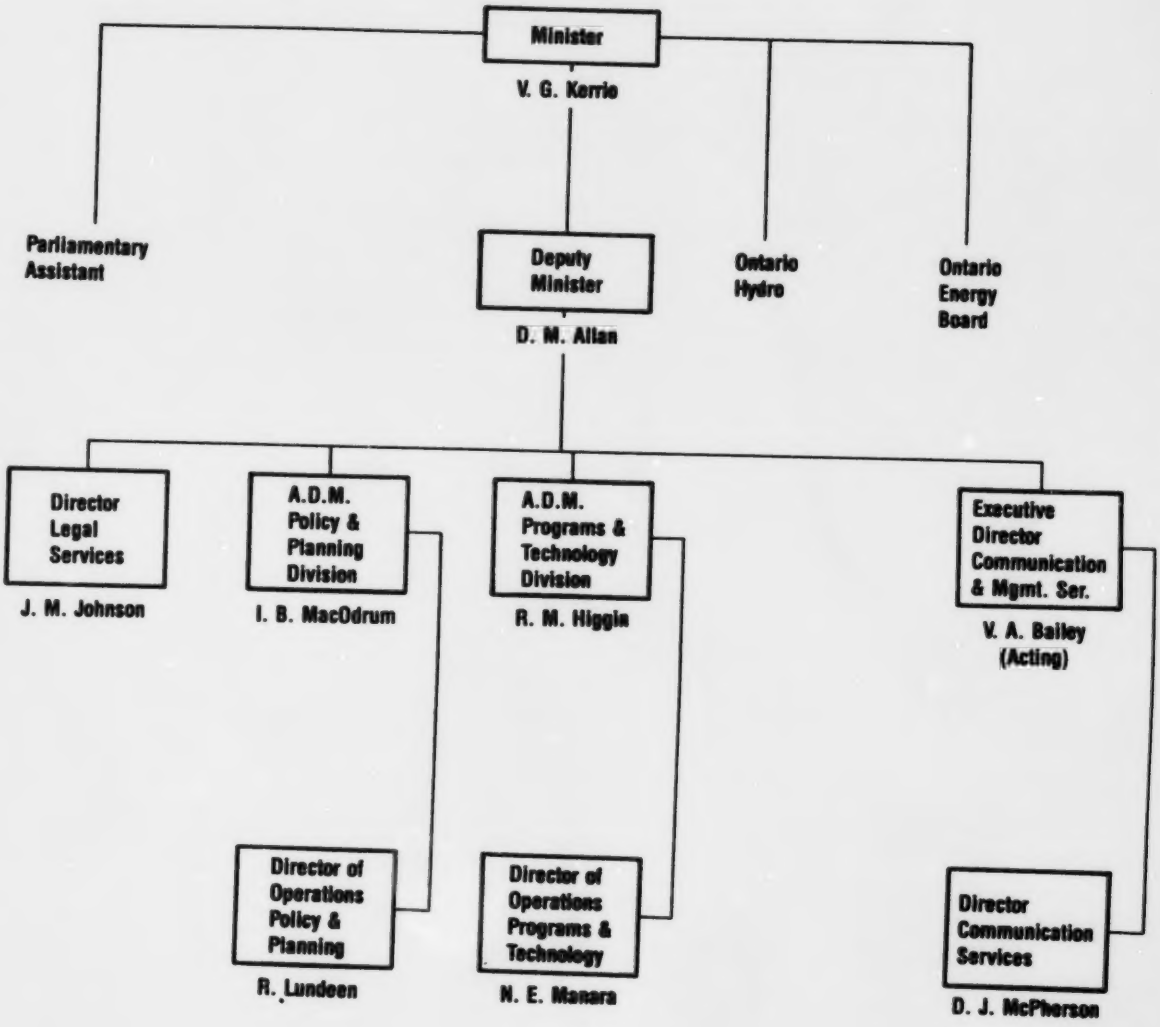
Energy Efficiency Improvements in Ontario

	Efficiency Gain From 1981	
Indicators of Energy Use	1985	1986*
Industrial Use/Output	8.9%	11.8%
Transportation Use/Registered Vehicle	10.1	12.7
Residential Use/Household	6.4	7.0
Commercial Use/Floor Space	7.9	8.9

	Barrels of Oil Equivalent	
Energy Use	1985	1986**
Total Primary Energy Per Capita	60.0	61.0
Total End Use Energy Per $1,000 Real GDP	7.3	7.1

*Estimated Percentages
**Estimated Figures

Ministry Organization Chart



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